

Elementary Curriculum & Technology Integration

Curriculum Technology Integration at Walnut Hills Elementary: A Search For Quality

Curriculum and Technology Integration

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Introduction

The purpose of this action research study was to improve the practice of curriculum and technology integration, technology that is integrated as a natural support for classroom curriculum teaching, at Walnut Hills Elementary in the Waukee Community School District. I am the K-5 technology teacher responsible for teaching 3-5 keyboarding and K-5 technology integration.

For this study, I chose to follow Mills (2007) outline of the practical action research model of action research. The first step in the practical action research process is to identify an area of focus. To aide my search for an area of focus I kept a teacher's journal for five consecutive teaching days to help me document my daily teaching interactions. Next, I analyzed my responses and found that I felt some grade levels, and individual grade level classrooms, practiced technology integration while others did not. As I pondered this analysis, I began to wonder, "what represents quality curriculum and technology integration practice at the elementary level?" This question allowed me to identify my area of focus to critically examine what constituted quality curriculum and technology integration and what strategies could be used to aide me, as the technology integration support person for the building, and my grade level teachers in improving the curriculum and technology integration practices within the building.

The next step in the practical action research process as outlined by Mills (2007) is to gather research to reflect upon current work in the field. I began this step by researching other professionals' work, through refereed journals, in my focus area to further guide my knowledge in curriculum and technology integration approaches. Next, I gathered qualitative and quantitative data from my building staff through a staff survey, three one on one teacher interviews, computer lab usage and activity data, and district technology standards, benchmarks, and integration policies. Finally, I will analyze and synthesize all materials to develop an action research plan that I can enact within Walnut Hills Elementary to improve our curriculum and technology integration practice.

Area of Focus

Over the past four years, I have observed the quality and scope of the technology integration practices within Walnut Hills Elementary. Additionally, there has been much confusion surrounding the policy and practices requirements for curriculum and technology integration. From these observations I have begun to feel dissatisfaction with the current approaches to technology integration and find that I, and the teaching staff, need a clearer vision for our curriculum and technology integration practice. I am not sure what technology integration standard we should be reaching to attain as a staff, but I know our momentum has slowed and I feel we need a boost to get us back on track.

With the recent district concentrated efforts to improve the district IT staff as a support mechanism for building technology issues and troubleshooting, the scope of my job as an elementary technology teacher has changed. Now, I have been offered the time and encouragement to strengthen our Walnut Hills Elementary curriculum and technology integration practices. Through this action research study I intended to identify and implement strategies that support classroom teachers' efforts in curriculum and technology integration.

Research Questions

- A. What should quality classroom technology integration look like within the elementary grade levels?
 - a. What practices or strategies could be used to help teachers integrate technology in more meaningful and curricular enriching ways?
 - b. What can technology support personnel do to support teacher curriculum and technology integration in the classroom?

Literature Review

Abstract

The literature related to classroom technology integration documents three overarching themes to quality classroom technology integration infusion. This literature review will highlight how the use of constructivist pedagogical teaching practices can offer one means of support for the infusion of technology into the classroom curriculum. To achieve a constructivist pedagogical environment, professional development practices in school must begin to change to reflect this strategy so teachers are being met on their learning level, by continuously supportive administrators and coaches, to enable teachers to begin creating this type of learning environment in their classrooms.

Introduction

Today technology fully encompasses the business and industry sectors within our global society (ISTE, 1999; Morrison & Lowther, 2002). The workforce skill requirements are also changing rapidly alongside the technology advancements. Now that technology is accessible in schools, the real task lies in teaching our students the skills that will promote our global society's ever changing technology literacy needs. Schools today are requiring areas teachers to learn new strategies for integrating the technology into their curricular content in ways that make teaching and learning meaningful and purposeful with its inclusion (Bauer & Kenton, 2005; Becker, 1998; Dooling, 2000).

Over the past 25 years, researchers have been delving into what factors effect the infusion of technology into classrooms and have identified four majors categories; the teachers' pedagogical beliefs, the ability to access the technology and technology resources, the inclusion of practical and purposeful professional development, and school and district personnel leadership in integrating technology into the classroom curriculum (Culp, Hawkins & Honey, 1999; Martin & Shulman, 2006; O'Dwyer, Russell & Bebell, 2004, Ravitz, Wong & Becker, 2000; Zhao, Pugh, Shelden & Byers, 2002). A recent study by Bauer & Kenton (2005) suggests that schools have not yet achieved true technology integration where technology becomes a vital part of teaching and learning over 50% of the time. In 1997 the Panel on Educational Technology stated schools should focus their technology integration practices on learning with the technology while emphasizing quality content and pedagogy. They also document that there should be a significant distinction between technology integration as an isolated subject to be

taught and technology integration as a tool to facilitate subject area learning (Swan et al., 2002). In essence, what should quality classroom technology integration look like within the elementary grade levels? What practices or strategies could be used to help teachers integrate technology in more meaningful and curricular enriching ways? What can teachers and school personnel do to support technology integration with their students?

The Constructivist Teaching Philosophy

Smerdon, Cronen, Lanahan, Anderson, Iannotti, & Angeles (2000) studied results documented by the U.S. Department of Education, and found that even though the access and availability of technology has greatly increased in schools over the last decade. Yet, the way teachers teach and students learn has not followed suit. According to Cuban, Kirkpatrick, and Peck (2001) and Semple (2000) teachers often resist the efforts to transition education away from its “linear, authoritative, and teacher-centered methods” (Levin & Wadmany, 2006, p. 157). Yet, there appears to be a parallel link between a teacher’s student-centered instructional beliefs and technology-integrated experiences (Levin & Wadmany, 2006; Judson, 2006; Totter, Stutz & Grote, 2006).

To reorient teacher’s pedagogical beliefs, teachers must change their beliefs on what technology integration is or should be. Technology integration should be seen as a process of interconnected activities, as a way of enhancing student learning, involving tools schools already have (Okojie, Olinzock & Okojie-Boulder, 2006). Technology integration is a more than just computers and software being used independently in a lab setting. Technology integration can even extend to technology tools such as media, models, and projected and non-projected visuals, audio, video, and digital media (Okojie et al., 2006; Lever-Duffy, McDonald & Mizell, 2005). True technology integration begins in the lesson plan development stage and ends in the assessment of learning at the conclusion of the lesson or unit. The act of infusing technology will not impact fully students or student learning if it is not seen as an integral part of instruction, by both the students and teachers (Okojie et al., 2006; Bauer & Kenton, 2005).

Notable educational groups have documented the importance of student-centered pedagogical teaching practices over the past fifteen years as a way for students to share new ideas through divergent thinking in a constructivist approach to teaching and learning (American

Association for the Advancement of Science, 1993; International Society for Technology in Education, 2000; National Council for the Social Studies, 1994; National Council of Teachers of English, 2000; National Council of Teachers of Mathematics, 2000). Further research by Ravitz, Wong, and Becker (2000) found that teachers using a constructivist teaching pedagogy within their classroom were much more likely to use technology integration strategies which, through technology integration infusion, further increased their use of a constructivist classroom pedagogy (Levin & Wadmany, 2006; Judson, 2006; Martin & Shulman, 2006, O'Dwyer, Russell & Bebell, 2004; Ravitz, Wong & Becker, 2000). The 2006 Instructional Practices and Classroom Use of Technology Survey also supported the work of Ravitz et al. (2000) by documenting two driving forces behind student learning through the constructivist belief system. First, constructivist oriented teachers believe it is vital to encourage student interest in academics in general rather than just content related subject matter. Second, they believe in the use of a variety of concurrently running classroom activities over whole class instruction through teacher directed teaching (Martin & Shulman, 2006).

Judson (2006) completed a research study of classrooms from which teachers felt they taught from constructivist pedagogy and found no direct correlation between constructivism pedagogical beliefs, practices, or attitudes toward technology. Instead he found that there were deeper dynamics. While his participants stated a firm pedagogical belief in constructivism, their corresponding technology integrated lessons did not adhere to the pedagogical practice of constructivism. Furthermore, Judson (2006) reported the use of technology is not the goal of constructivism. Instead constructivist-teaching practices should be emphasized to teachers during professional development trainings as a means of enabling students to push for deeper meaning and knowledge where technology can be used as a tool to further the constructivist approach.

Technology Integration Professional Development Training

Judson (2006) and Pierson (2001) both advocate that professional development training is a necessary tool that should be used to encourage technology integration in a constructivist manner. They further noted the constructivist teaching philosophy with the inclusion of an emphasis on technology integration, without the show of forcing the infusion, is an encouraging

way to enhance instruction and student learning and as a way of preparing students for a global technology rich future. Change is hard for anyone, especially for adults who are used to one method or practice (Judson, 2006).

Research suggests that student achievement and success are tied to students' interactions with effective teachers (Darling-Hammond, 1997; Mizell, 2001; Mitchem, Wells, & Wells, 2003). As a result, Mitchem, Wells, & Wells (2003) state there is a direct need for the educational field to merge together as a driving force to promote a common pedagogical practice that is supportive of technology integration, effective at teaching the technical skill and pedagogical knowledge necessary to support new technology tools, that offers continuous support resources to help change instructional practice, and which can effectively evaluate teaching and student learning as a direct result of the integration of technology and technology tools that are abundant within our global world.

To achieve these lofty goals within the teaching profession, professional development must become more dynamic in order to coincide with the fast paced changes that are occurring within our educational system. Mitchem, Wells, & Wells (2003) noted the National Staff Development Council (2002) has amended their professional guidelines to require schools to take their professional development practices to the next level to incite change and encourage an even higher quantity of academic student success as a direct result of 'out of the box' staff development training. As a new school culture emerges, enriched with the technologies our world is quickly embracing, a new classroom climate must also emerge. This new classroom climate must be a place where learners are the center of our teaching, where technology tools are intricately intertwined with student's everyday classroom experiences, and where, when the two are combined together are used as a driving force to change and transform the way teachers teach and student learn.

How then do we create this structural climate change in our schools? According to the 2006 Instructional Practices and Classroom Use of Technology Survey schools currently use three types of technology professional development practices. These recent practices include 1) workshops and seminars given by district personnel, 2) district or school offered classes, and 3) workshops and seminars given by outside offers (Martin & Shulman, 2006). Sugar (2005) and Bauer & Kenton (2005) suggest that one-day workshops are not the answer for professional development technology training. Instead, district administrators need to look at the long-term

needs and development of their staff to encourage collaboration and continuous support that embraces technology in the classroom through their professional development practices (Bonk, Ehman, Hixon & Yamagata-Lynch, 2002; Mitchem, Wells & Wells, 2003).

Some advocate that teachers need to be trained how to create a learning environment that is based on solid pedagogical practices while also being intellectually stimulated within a technology rich context so that today's students are prepared to be leaders in the working world in the tomorrows ahead (Mitchem, Wells, & Wells, 2003). To create this type of learning environment, schools should begin by changing the dynamics of their professional development training to teach teachers how to embed technology into their classroom climates and curricular teaching (Darling-Hammond, 1997; Mitchem, Wells, & Wells, 2003). The infusion of situated professional development, based on Brown, Collins & Duguid's (1989) model of situated cognition, could be used to create a new, more dynamic, environment (Carney, 1998). Whereas traditional professional development approaches proportionately support instructionist, application-driven procedures (Sugar, 2005; Swan, Holmes, Vargas, Jennings, Meier, & Rubenfeld, 2002), the situated professional development approach "grounds teachers' learning experiences in their own practice" (Putnam & Borko, 2000, p.6).

Research conducted by Smylie (1989) and Little (1994) document professional development approaches that are situated in real classroom experiences are the most beneficial learning opportunity out of a possible fourteen other learning opportunities. Bitner and Bitner (2002) advocate for teacher empowerment as a means to earn teacher involvement. Teachers need to feel that their district administrators are listening to their teaching needs and providing training that directly benefits them as learners and as teachers (Bitner & Bitner, 2002; Okojie, Olinzock & Okojie-Boulder, 2006). Bradshaw (2002) supports this theory as his own observations document that there does not appear to be a direct link between staff development training and immediate classroom implementation, instead the staff development training needs to create the "transparent link" between the content of the training and the content of the teacher's classroom.

For true technology integration to occur the technology training needs to match teacher pedagogical beliefs and should be directly tied to the curricular content they teach daily because "the power to develop innovative technology-supported pedagogy lies in the teacher's interpretations of the technology's value for instruction and learning in the classroom" (Hughes,

2005, p. 16). Consequently, district administration must accurately know, or assess, where teachers lie in their skill knowledge and what they need to advance them on to the next level. Mitchem, Wells, & Wells (2003) point to Senge's five Stages of Learning (1995) as a measurement tool that can be used to assess teacher's technology skill knowledge level; they are (a) novice, (b) advanced beginner, (c) competent, (d) proficient, and (e) expert. Once skills knowledge levels are known, professional development sessions can be developed around teacher's technology needs and knowledge levels.

Next, school districts can design professional development opportunities around situated professional development programs. Putnam and Borko (1997) found the following four practices to be essential for successful learning in a situated professional development environment; (a) teachers must be regarded as active learners and thinking situated around their knowledge levels, (b) teachers should be offered opportunities for empowerment as professionals, (c) professional development should be situated through the classroom arena around a constructivist focus, and (d) trainers and educators should treat their professional development teachers as they would expect teachers to treat their students, with respect and dignity (Swan et al., 2002).

Teachers who are integrating technology into their classrooms must approach these new educational tool as they would any other, from the position of a practicing professional who is also a lifelong learner, a learner who uses their existing pedagogical beliefs and knowledge to situate himself or herself into this new learning arena (Hughes, 2005).

Technology Integration Support

Situated professional development training, coupled with ongoing technology assistance and support by a instructional technology coach or mentor, can serve as a viable alternative to a one-size fits all approach to in-service technology workshops and trainings. The role of a technology coach or mentor is one of various titles and responsibilities. School to school these positions can vary immensely. The skills required of a person serving in this position can also vary tremendously. Students within the school can also serve as technology mentors or coaches. The use of students as classroom mentors is also a sustainable method of increasing technology integration into the classroom. According to Bitner and Bitner (2002), the use of student

technology mentors helps students to build self-esteem, self-confidence, an increased interest in learning, and ownership of their work and learning environment. They are untapped assets for many schools; they just need to be encouraged to show their skills.

In general, a professional in the position of a technology coach should be someone who is continuously and constantly available to support teachers in their integration efforts. This person should also possess technology technical skills as well as people skills and should be able to blend these two skills sets together as needed to meet a teacher's needs in a supportive, and empathetic, way so as to increase the confidence level of the teacher as they are learning to integrate technology into their classroom curriculum and routines (Sugar, 2005). Strudler, Falba, & Herrington (2001) state that schools with persons who are assigned to support instructional technology are much more likely to have staff members use technology to engage students through the use of technology.

Teachers need continuous support for a variety of technology uses from the personal, such as inputting grades into an electronic grade book, to student projects, such as an Internet webquests, to instructional, such as using PowerPoint to present information to the class. According to Sugar (2005) an instructional technology coach is responsible for maintaining technology integration momentum with the classroom teachers. While this too can mean a variety of things, Sugar (2005) and Swan et al. (2002) suggest coaches conduct weekly coaching meetings, in addition to any professional development training teachers may receive at the school or district level. As these weekly meetings approach Sugar (2005) and Swan et al. (2002) suggest there should be no set agenda for the session. Instead, the coach should let the teachers set the agenda at the meeting based on what they need assistance with, have questions on, or want to share with others.

The CATIE program, Capital Area Technology and Inquiry in Education is one example of a situated technology integration coach or mentor program. The CATIE program places technology experts in schools as a support mechanism for training teachers technology integration strategies and skills (Swan et al., 2002). The goal of the CATIE program is to design computer-supported lessons, and classroom units, where technology is embedded as an integral component of the instruction. The integration coach also encourages constructivist based pedagogical practices, but does not force them onto the teachers. Instead, they use modeling and guidance to provide a quality context through which teachers can understand the need for

constructivist teaching and learning during the integration of technology based lessons and units. After several teacher technology integration successes have been achieved, the coach slowly fades their assistance and the teachers confidently take on their own planning and implementation of technology integration strategies in their classroom curricular teaching. (Swan et al., 2002). The CATIE program encourages the use of small workshops, one-on-one mentoring, modeling, and handouts as training tools. However, each of these strategies should be situated around flexible teacher learning needs and must emphasize teachers as professional learners and thinkers expanding their knowledge of new ideas and teaching tools (Swan et al., 2002).

Comparatively, Sugar (2005) also documented similar research on technology integration coaching in schools. Sugar's (2005) research encouraged their coaches also use the practices the CATIE program endorses. Additionally, Sugar (2005) found a direct need for the coach to approach classroom teachers from an empathetic, flexible working arena where the teachers initiated their own technology integration goals. In this coaching scenario regular emails and weekly training sessions were used as follow up tools to share resources relating to the teacher's technology needs. In both coaching models, the coaching sessions were most successful when teachers' needs were met on their skill level, as a colleague, with a sincere amount of empathy and patience from the coach and teacher-learner.

There is not one approach to technology integration training, either through professional development or coaching, that will work for all. Instead a variety of strategies, skills, and support should be provided to meet teachers where and when they need the most assistance. Instructional technology support personnel provide support, not only on an instructional level, but also on a technical and personal level. Technology coaches should take on their roles from a collaboration standpoint that supports and advocates for the teachers to build technology confidence (Sugar, 2005).

Conclusion

This literature review of recent research does not point to one particular program with the ability to answer the technology integration infusion concerns. It does however document that change over time can occur, change in pedagogical teaching and learning beliefs, change in professional development approaches, and change in the assistance of on-going technology

integration support. Through the infusion of constructivist oriented pedagogical training, such as professional development and/or mentoring or coaching opportunities, teachers can be provided with the opportunity to interact with new technology tools, that are centered on teacher learning and classroom curriculum needs. This, coupled with the support of on-going resources, strategies, and training can all combine to become an effective means for teaching teachers how to gain confidence in their abilities to integrate technology in meaningful and curricular ways into their daily classroom activities. And finally, the underlying principle to the success of technology integration in schools lies in the extent to which administrative, collegial, student, parent, and even community support of these new teaching and learning approaches is provided to schools (Swan et al, 2002).

Recommendations for Further Research

State technology compensation packages have helped schools to meet hardware requirements, yet they are not a solution to the over extending problem. Schools funding is not able to keep up with business and industry technological advancements. Further research is needed to review the constant need for school funding, or lack of funding, for technology hardware and software. These are two areas that cannot be neglected for quality technology integration to occur. Additionally, the research reviewed did not address several student related issues which Bauer and Kenton (2005) were also left pondering; the problem of integrating technology into the classroom where students' technology skill level, or lack thereof, greatly affect the outcome of the lesson and student learning. Further research is recommended to address the discrepancies between technology integration into the classroom curriculum and the necessary student skill knowledge level that is required for quality technology integration to happen.

Intervention or Innovation

This action research project was conducted to ascertain what quality classroom technology integration should look like within the elementary grade levels, what practices or strategies could be used to help teachers integrate technology in more meaningful and curricular